APPENDIX D: Wetlands Primer

I. Why should we care about wetlands?

Wetlands

- improve water quality by cleansing our waters of nutrients and toxics;
- serve as a buffer to protect our shorelines from storm damage;
- prevent flooding by providing storage of floodwaters;
- prevent erosion The roots of wetland plants stabilize the banks;
- provide open space for aesthetics, education and recreation;
- provide essential habitat for many species of plants and animals, including rare and endangered species.

Wetlands are required by many types of animals and plants for survival. For many species, including the wood duck, snapping turtle, muskrat, green heron, cattail and buttonbush, wetlands are the only places they can live. For other animals, such as fish and amphibians, wetlands are critical breeding areas. Even terrestrial or upland animals frequently require wetlands to obtain food, water or cover.

Fish: All of Massachusetts' fish depend on wetlands either directly or indirectly since wetlands are vital to maintaining water quality and regulating stream flows. Many fish feed in wetlands or upon wetland-produced food, and/or their young use wetlands, especially riverine wetlands, as nursery grounds.

Birds: Massachusetts's wetlands are valuable resources for birds by providing year-round habitats for resident species, and breeding sites, wintering grounds and feeding areas for migratory birds, including waterfowl, and many songbirds such as marsh wrens, yellow warblers, and common yellowthroats.

Mammals: The more frequently observed wetland mammals are muskrats, beaver and eastern cottontail rabbits. White tail deer also use wetlands for food and cover.

Amphibians and reptiles: Many amphibians, frogs, toads and salamanders, as well as snakes and turtles, use wetlands for food and cover. Vernal pools (small, seasonally flooded pond-like wetlands surrounded by forests) are the only breeding sites for frogs and many salamanders.

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Loss of wetlands costs public dollars. Where wetlands have been destroyed, their functions must be replaced, usually at great public expense, by manmade structures such as water and wastewater treatment plants, flood control dams and shoreline protection structures**.**

***II. How can you identify a wetland*?**

Wetlands are lands that are flooded or wet at or near the ground surface for varying periods of time during the year. To a certain extent, the wet character of wetlands limits the use of the land (e.g., usually the owner can't farm without draining and can't build with out filling).

Wetlands are identified by wetland plants and by soils. When soils are flooded for a few days, the soils usually become oxygen-deficient (evidenced by the gray color below the surface). In soils frequently flooded for very long periods, peat or muck accumulate at the surface. Only plants with special adaptations can live in these soils.

You may know where the wetlands are located from past experience or from looking at a USGS "topo" map or from a municipal map. In the field, if you walk on a wetland, you wade through water, or you feel the ground is spongy underfoot, or if it is during the dry season, you may find it dry on the surface (and wet a foot or more below.) If you are in a wetland during the dry season (usually in summer), look for clues that water is present at other times: Wetland plants have

elevated roots; dead leaves on the ground are gray or black; the "wrack line" of dead plant material shows that water has been present.

[You can order copies of wetland maps from DEP's Wetlands Conservancy Program (619-292-5907) for some areas of the state. The U.S. Fish & Wildlife Service has National Wetlands Inventory maps - generalized maps of larger wetlands. Call 413-545-0359 to order.]

III. What are the types of wetlands?

Vegetated wetlands may be separated into three major types: (1) marshes and wet meadows; (2) shrub wetlands; and (3) forested wetlands.

Inland: Inland wetlands are wetlands that are not flooded by tides. The majority of the state's wetlands fall into this category - almost 500,000 acres of inland wetlands are present in Massachusetts.

Marsh: Marshes are flooded for most of the growing season. Characteristic plants include cattail, bur-reeds, sedges, blue flag irises, as well as invasive plants such as phragmites and purple loosestrife. Shrubs may be found at the edges.

Wet meadow: Wet meadows are saturated for extended periods during the growing season. Wet meadows contain grasses, sedges and rushes as well as wildflowers. Wet meadows have been used as pastures through the years.

Shrub swamp: Shrub swamps include a wide variety of wet shrubby thickets ranging from nearly permanently flooded buttonbush swamps to seasonally flooded alder swamps. Shrubs and bushes form a fairly continuous cover and may be difficult to walk through. Trees may be scattered about or in clumps. In the spring, swamps are usually covered with standing water, but as summer progresses, the surface may dry completely. A **bog** is a type of shrub swamp that forms in depressions under nutrient-poor and acidic conditions. Bogs have saturated peaty soils that are soggy year-round. Low-growing evergreen shrubs with broad leaves are characteristic species. They include leatherleaf, bog rosemary, bog laurel, and sheep laurel. Because of the lack of nutrients, insect-eating plants like pitcher-plants and sun-dews can be found here.

Forested wetlands: Forested wetlands - wooded swamps - can be dominated by trees that shed their leaves each fall or by evergreens. Red maple is typical of the wetter swamps.

Coastal:
Tidal wetlands are those wetlands where water levels periodically change due to the tides. About 100,000 acres of salt and brackish wetlands are found along coastal embayments and along tidally influenced rivers throughout the coastal zone. The presence of salt water severely limits the types of plants that can grow there. Some freshwater wetlands are also tidal, since the incoming tides cause a rising and lowering of both salt and fresh water. Salt/brackish marshes provide home for shellfish as well as spawning grounds for two-thirds of the state's recreational and commercial fish species. Salt marshes are among the most biologically productive habitats in the world.

(For more information about wetland species see a wetland manual such as "Maine Wetlands and their Boundaries." The MA Audubon Society or the MA Association of Conservation Commissions can make recommendations about other wetland manuals.

IV. What is a healthy wetland?

A healthy wetland is a wetland that does not show signs of stress related to a significant degradation or to cumulative effects of smaller degradations.

• Healthy wetlands have a diverse and vigorously growing native plant community (with no invasive plants such as phragmites and purple loosestrife);
• Healthy wetlands demonstrate good water quality (no pollution discharges, no fill, no trash);
• Healthy wetlands have good hydrology (no alterations that restrict the flow of water into, through, or out of the wetland).

V. What degrades a wetland?

Questions on the data sheet of the Wetland Survey give a good indication of what degrades a wetland.

Vegetative degradation:
1) Exotic species: Nonnative (invasive) species replace native plant species that support existing wildlife and fish populations (examples of invasive plants include phragmites and purple loosestrife).
2) Removal of vegetation: Loss of wetland vegetation damages habitat necessary for wildlife and fish.
3) Streambank disturbance: Disturbing the streambank decreases bank stability and may increase erosion and degrade water quality.

Changes in Wetland elevations:
1) Fill: Whether clean or degraded, fill has a damaging effect on wetlands. The deposition of fill smothers existing vegetation and changes elevation and water levels. Many wetlands have been filled to the point that they no longer function as wetlands. Polluted fill obviously degrades the wetland even further.
2) Flooding: Dead or dying trees in standing water is a sign that the water levels have changed beyond seasonal changes. Flooding may signal natural causes such as a beaver dam or human actions such as highway construction.

Hydrology changes:
1) Drainage ditches: Drainage ditches have been constructed in wetlands to lower water levels. This has been done to make wetlands suitable for growing crops or to prepare wetlands for development. In other cases, ditches have been dug for mosquito control - to drain pools of standing water that produce mosquitos. Material excavated when the ditches are made is typically deposited on the wetland as fill. This fill creates berms that may prevent water from flooding the wetland.
2) Excavation: Excavation of wetlands involves removing sand and gravel underlying wetlands or constructing ponds in wetlands. This changes the character of the area from a marsh or swamp to open water. This causes a change in fish and wildlife use and other functions. Mining sand and gravel deposits in wetlands may expose underlying aquifers. It may also expose the aquifer to surface water pollution.

Wetlands play a role in providing healthy flows for rivers. By storing excess water in times of high flow, wetlands moderate flooding. Water, held by wetlands, is released slowly, supplementing flow in times of drought and low flow. Poorly functioning wetlands may harm the river flow regime.

Water quality degradation
1) Stormwater discharges: The discharge of stormwater directly into wetlands may bring unwanted chemicals such as road salts and sediments (sometimes bonded with toxics) that degrade the wetland. This may lead to changes in the plant community and subsequent wildlife use. Phragmites often invades such sites.
2) Effects of pollution: Pollutants (e.g. chemicals such as fertilizers, herbicides, and pesticides) can overpower the environment and exceed the natural system's ability to assimilate, utilize or retain them. The pollutants degrade water quality in the wetland and in the rivers and estuaries downstream.

3) Erosion and sedimentation: Erosion leaves wetlands and streams clogged with sediment. This excess material changes the elevations of the wetland with possible changes in habitat for plants and animals and changes in hydrology.

Another of the important functions of wetlands is their ability to improve water quality by removing pollutants. Monitors of river water quality often report significant improvement of water quality once a stream has gone through a wetland. However, by discharging pollutants directly into the wetlands, we may overburden the natural cleansing ability of the wetlands.

VI. Remedies: Whom do you call?

Violations

Local Conservation Commission

Call the municipal Conservation Commission when there are violations of the Wetlands Protection Act. (This act regulates alteration (including dredging, filling, removal of wetland vegetation, etc.) *You must see evidence of ongoing work*. Examples of this could be bulldozers in the wetland or bulldozer tracks; recent digging in the wetland; new fill; freshly cut trees. *There must be an adverse impact to the wetland* for the Commission to act. The Commission has the power to place an enforcement order, which requires the work to stop. They have additional powers to require the proponent to restore the wetland.

Local Board of Health: Call if you detect a sewage smell in the stream and/or if the water looks cloudy.

In addition to calling, a follow-up letter should be sent reporting the action and asking for a response on the action taken.

Restoration

Wetland Restoration and Banking Program (WRBP)

Wetland Restoration and Banking Program (WRBP): WRBP implements a program for proactive (voluntary) wetlands restoration initiative called "GROWetlands" (Groups Restoring Our Wetlands). Created in 1993, WRBP is looking for degraded and destroyed wetlands to restore where there is no obvious current violation wetland law. WRBP seeks GROWetlands sponsors (civic groups, town governments, business groups, etc.) for wetlands restoration projects. The wetland may be filled with sediment, or barren, or may have been ditched for drainage, or may be dominated by phragmites. WRBP can help you evaluate the condition of the wetland and determine whether the wetland is a candidate for restoration. If it is, WRBP can help you get started. Getting the cooperation of the landowner is an important first step!

GROWetlands sponsors receive technical assistance and help securing project funding from WRBP and, in return, they agree to use the project to provide public education and essential data about the project. WRBP coordinates the Partnership To Restore Massachusetts Wetlands, an alliance of government and private groups, businesses, and individuals who work together to support GROWetlands projects. Many of these groups have funding programs for restoration projects.

For more information get in touch with the WRBP:

- Wetlands Restoration & Banking Program, Executive Office of Environmental Affairs
- 617-292-5991
- Email: cfoote-smith@state.ma.us